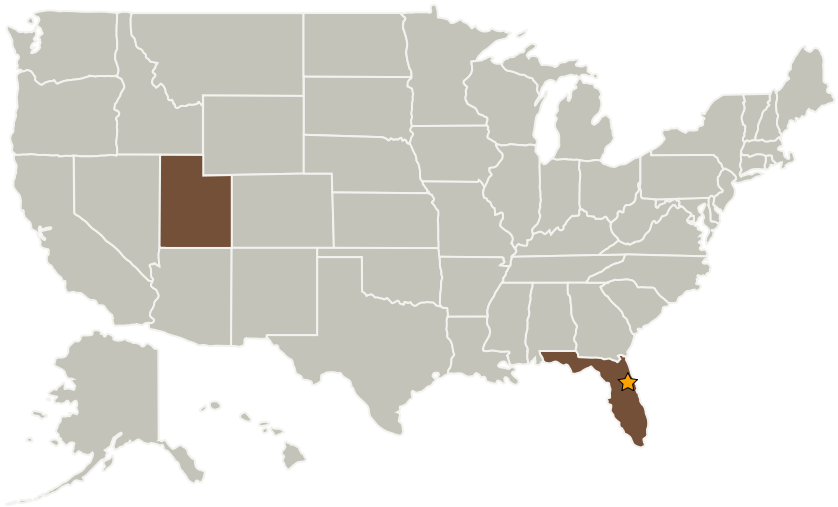
Arrays of Remote Autonomous Sensors Using On-Board Hybrid Power Supplies, Phase I

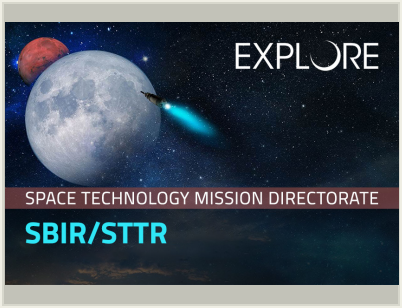
Completed Technology Project (2004 - 2004)

Project Introduction

There is significant need for arrays of miniature sensors that are completely wireless. Ideally these sensors would be built as an integrated device, including sensing elements, computation/signal conditioning, communication, and an on-board power supply. However, they have not been developed due to the difficulty with integrating sensing ele-ments, and the absence of miniature power supplies. The purpose of this Phase I program is to address these two issues, and make viable, wireless, miniature sensors. Bipolar Technologies has pioneered the development of micro-scopic rechargeable batteries, built with IC processes, for direct integration into microcircuits. When combined with miniature energy scavengers, a hybrid power supply can be created, to provide autonomy for wireless sensors. During Phase I, the concept of using a miniature hybrid power supply will be demonstrated with arrays of prototype sensors, built with commercial off-the-shelf components. Microscopic, microfabricated lithium polymer batteries will be engineered, fabricated and used as part of the hybrid power supply. Phase II will be used to refine the micro-fabrication processes used to make batteries and sensors, so that completely integrated multisensors can be delivered to and used by NASA. This micropower supply will enable a new class of completely wireless sensors.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Kennedy Space Center (KSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Bipolar Technologies	Supporting Organization	Industry	Provo, Utah

Primary U.S. Work Locations	
Florida	Utah

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Rodney Lafollette

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  - TX02.2 Avionics Systems and Subsystems
    - TX02.2.6 Data Acquisition Systems